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veterinary  
parasitology

Veterinary Parasitology 115 (2003) 71–74

[www.elsevier.com/locate/vetpar](http://www.elsevier.com/locate/vetpar)

Short communication

## Prevalence of antibodies to *Neospora caninum* in dogs from Amazon, Brazil

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Received 15 November 2002; received in revised form 26 March 2003; accepted 31 March 2003

### Abstract

*Neospora caninum* is an important cause of abortion in dairy cattle worldwide. Dogs are important in the epidemiology of this parasite because they are the only hosts known to excrete *N. caninum* oocysts. Antibodies to *N. caninum* were assayed in serum samples from 157 dogs from Monte Negro, Rondônia, Amazon, Brazil using the indirect fluorescent antibody test. Antibodies to *N. caninum* were found in 13 (8.3%) of dogs in titers of 1:50 in 1, 1:100 in 2, 1:200 in 5, 1:800 in 1, 1:1600 in 2, and 1:3200 in 2 dogs. These data indicate that *N. caninum* infection is prevalent even in remote areas of the Amazon.

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**Keywords:** *Neospora caninum*; Antibodies; Indirect fluorescent antibody test; Brazil; Amazon

### 1. Introduction

*Neospora caninum* is a coccidian that can cause severe clinical disease in dogs, cattle, and other animals (Dubey et al., 1988; Thilsted and Dubey, 1989; Dubey and Lindsay, 1996; Anderson et al., 2000). Dogs are important in the epidemiology of *N. caninum* infection

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because the domestic dog (*Canis familiaris*) is the only definitive host known to excrete *N. caninum* oocysts (McAllister et al., 1998; Basso et al., 2001). Seroepidemiologic studies have reported a positive relationship between dogs and bovine neosporosis (Paré et al., 1998; Sawada et al., 1998; Wouda et al., 1999). There are many serologic surveys for *N. caninum* infections in dogs worldwide (for review see Lindsay and Dubey, 2000; Dubey, 2003), and in Brazil (Gennari et al., 2002). The objective of the present study was to survey dogs from the county of Monte Negro, Amazon, (10°18' South; 63°14' West) Brazil for *N. caninum* antibodies.

## 2. Materials and methods

At the time of the blood collection, the city of Monte Negro had 671 dogs distributed in 85 of the 94 blocks of the city, and at least one dog from each block was sampled (mean = 1.9 with a range of 1–4 dogs). The dogs were of different breeds and ages, and 63 (40.1%) were females and 94 (59.9%) males. The dogs had owners, however, 106 (67.5%) had free access to the streets. Only six dogs (3.8%) received commercial food and the others (96.2%) were fed home prepared food. These data were collected by door to door survey; there is no central registry of animals in this remote part of the world.

Blood samples were collected from a jugular or brachial vein and sera were separated and stored at –20 °C until tested for *N. caninum* antibodies using indirect fluorescent antibody test (IFAT) using culture-derived tachyzoites of the NC-1 isolate (Dubey et al., 1988) and the rabbit anti-canine IgG conjugate (Sigma, St. Louis, MO). Sera were tested at 2-fold dilutions starting at 1:50 using the procedure described by Dubey et al. (1988).

Assessment of association between the result of the test and the characteristic of animal (sex, age, type of breeding and diet) was by logistic regression in two steps: univariant analysis and multivariant analysis. In the second step all variables were included in the model and were excluded by *backward elimination* using the likelihood-ratio test. The goodness-of-fit test for the final model was performed by Pearson's chi-squared test. *P*-value (<0.05) was used to assess the existence of towards the null hypothesis and STATA software was used for the statistical analysis (StataCorp., 1999).

## 3. Results and discussion

Antibodies to *N. caninum* were found in 13 (8.3%, IFAT > 1 : 50) of 157 dogs. The number of infected dogs at each serum dilution tested is shown in Table 1. Seroprevalence values were similar in dogs from different ages, breeding and diets (*P* > 0.05), despite the higher values found in street dogs, and dogs fed home made diets (Table 2). Antibodies to *N. caninum* were found in 13 of 136 dogs older than 6 months but not in any of the 21 dogs less than 6 months of age; these data suggest post-natal acquisition of *N. caninum* infection in dogs (data not shown in Table 2).

Results indicate that dogs in Amazon are exposed to *N. caninum* infection and neosporosis should be included in differential diagnosis of canine neurological disorders in dogs in this area.

Table 1

Antibodies to *N. caninum* in dogs serum from Monte Negro, Rondônia, Amazon, Brazil

Antibody titer	No. of dogs	Percent infected (%)
50	1	7.7
100	2	15.4
200	5	38.5
400	0	0
800	1	7.7
1600	2	15.4
3200	2	15.4

Table 2

Occurrence of antibodies to *N. caninum* in dogs from Monte Negro, Rondônia, Brazil by sex, age, breeding and diet

Variable	n (%)	Seropositivity (%)
Sex		
Female	63 (40.1)	7.9
Male	94 (59.9)	8.5
Age (months)		
0–24	40 (25.5)	10.5
>24	117 (74.5)	9.4
Breeding		
In door	51 (32.5)	2
Street	106 (67.5)	11.3
Diet		
Commercial	6 (3.8)	0
Home made	151 (96.2)	8.6

## Acknowledgements

We would like to thank CAPES for the fellowship to W.A. Cañón-Franco.

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